Small Business Innovation Research/Small Business Tech Transfer

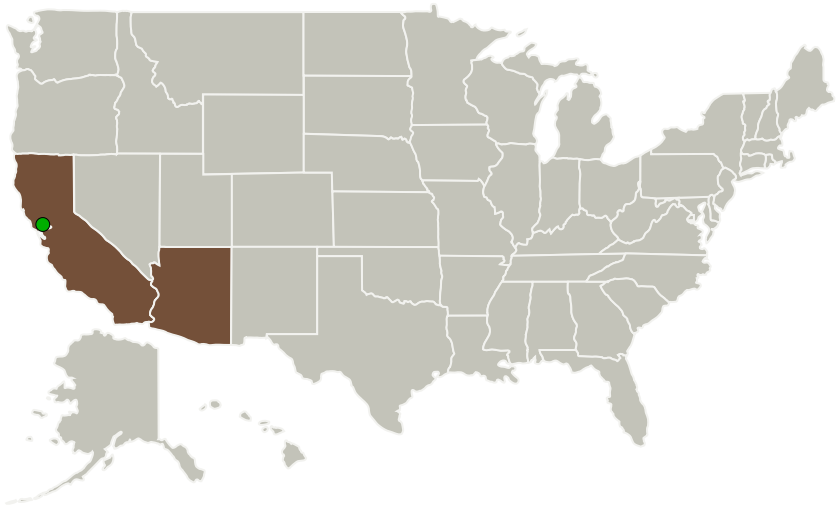
Predictive Gust Load Alleviation Control Using Leading Edge Stagnation Point Sensor, Phase I

Completed Technology Project (2012 - 2012)

Project Introduction

ZONA Technology, Inc. proposes an R&D effort to develop a Gust Load Alleviation (GLA) control system using a novel Leading Edge Stagnation Point (LESP) sensor that has the nearly instantaneous predictive capability. The real-time gust information from the sensor will enhance the performance of the proposed GLA control system. The GLA control method we will adopt is the Generalized Predictive Control (GPC), which consists of identification of the flexible system perturbed by gusts and minimization of the prediction response error by optimal control design. The GPC scheme has a "feedback and feedforward" topology and solves Multi-Input Multi-Output control problems. The measurements of gusts via the LESP sensor, which reduces the inherent delay associated with conventional sensing of the structural responses, can be incorporated into the controller in the feedforward path, hence the GLA performance is improved. ZONA will further assess the effectiveness of the control system on a high fidelity model of a Body Freedom Flutter vehicle, which is a flexible flying wing configuration vehicle designed and flight tested by Lockheed Martin Aeronautics Company.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ZONA Technology, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Scottsdale, Arizona
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
Arizona	California

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138424)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ZONA Technology, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

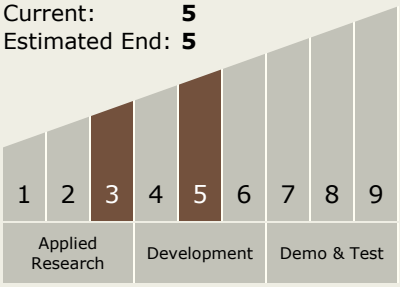
Carlos Torrez

Principal Investigator:

Jiang Wang

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX15 Flight Vehicle Systems
  - TX15.1 Aerosciences
    - TX15.1.3 Aeroelasticity

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System